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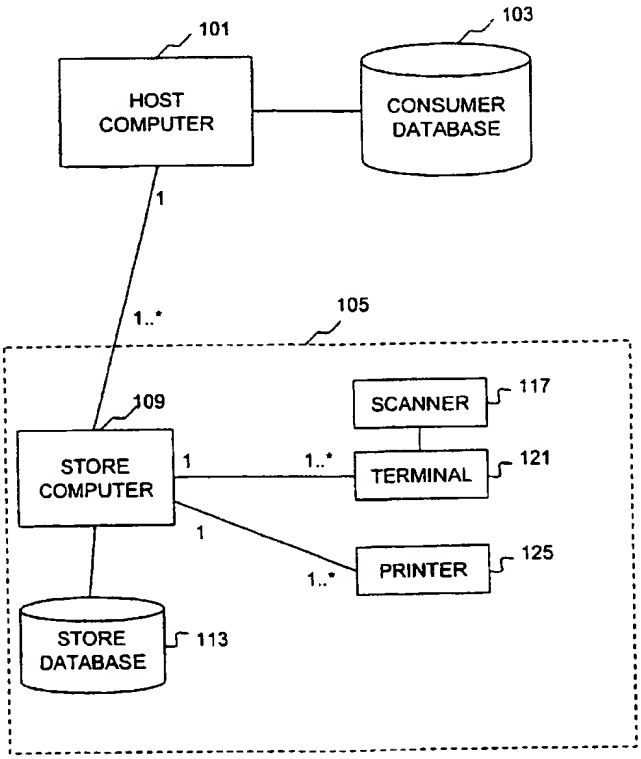

(57) Abstract: A method, system, and computer program for providing purchase incentives to customers is disclosed. Identifying information of a customer is received by a computer during a purchase transaction at a retail store (figure 1, items 101, 109). The computer determines a purchase incentive associated with the identifying information of the customer and based on purchase history information of the customer, the purchase incentive including a loyalty condition for increasing the customer's loyalty to the store and a reward to be provided to the customer (figure 2, item 205, figure 3, item 307). A printer coupled to the computer prints the purchase incentive. When the customer returns to the store to make another purchase transaction, the computer receives again the identifying information of the customer and determines whether the customer has met the loyalty condition. If the customer has met the loyalty condition, then the customer is rewarded. In alternative embodiments, all or a portion of the processing is performed by a host computer and/or a store computer coupled to the host computer.

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Method and System for Providing Purchase Incentives Designed to Increase Customer Loyalty

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims benefit of and priority to U.S. Provisional Application Serial No. 60/162,009, filed October 27, 1999, entitled "PROVIDING PREFERRED PRICING ON FUTURE RETAIL SALES PURCHASES," and incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention:

The present invention relates generally to the use of a computer, and more specifically to a method, system, and computer program product for providing purchase incentives designed to increase customer loyalty. As used herein, the term "purchase incentive" refers to any announcement for inducing desired purchase behavior or habits. A purchase incentive may take the form of a coupon, certificate, e-mail, or promotion, for example.

Discussion of the Background:

Typically advertisers take a "one size fits all" approach to advertising. That is, advertisers provide the same coupons and incentives to all consumers, regardless of the purchase habits of each consumer. For example, a retail store may announce a purchase incentive designed to encourage customers to shop at the retail store and to promote customer loyalty to the retail store. For this purpose, the purchase incentive may include a reward that consumers receive if certain conditions of the purchase incentive are met. For example, the purchase incentive may state "Spend $500 total over the next five weeks and receive a free 12 pound turkey." This type of purchase incentive may be advertised on television, the radio, or take the form of a printed coupon or advertisement in a publication or flyer, for example. This type of purchase incentive may produce marginal sales increases as a result of the incentive to win a free 12 pound turkey; however, this "one size fits all" purchase incentive does not benefit all consumers equally and provides relatively little return to the store for the money spent on the promotion (i.e., increases in customer loyalty are relatively low).

Consider the following situation: household A, two professionals, now spends $40 a week on groceries; household B, a family of three, now spends $100 a week on groceries; and household C, a family of five, now spends $200 a week on groceries. When household A receives the purchase incentive (i.e., spend $500 total over the next five weeks and receive a free 12 pound turkey), it may not even consider participating in the program because household A's spending on groceries would have to increase 150% (i.e., by $60 per week) to receive the free 12 pound turkey. On the other hand, household B, which currently spends $100 per week on groceries, will probably participate in the program since household B only needs to maintain its $100 per week expenditure on groceries. Lastly, household C, which currently spends $200 per week on groceries, will certainly participate in the offer because household C is almost guaranteed to qualify for the free 12 pound turkey without having to alter its current purchase habits.

Accordingly, it can be seen that the conventional approach to loyalty programs provides purchase incentives that may not induce desired results (i.e., an increase loyalty and spending at a certain retail location or a chain) from many, if not most, of the households that receive the purchase incentive. Many consumers (e.g., household A) will not even consider participating in the loyalty program because the purchase incentive requires an unrealistic increase in grocery expenditures to receive the reward. Other households (e.g., household B) are only marginally affected by the purchase incentives because they merely have to maintain their current level of loyalty to qualify for the reward. Lastly, households that already exhibit loyalty that far exceeds the requirements of a conventional purchase incentive (e.g., household C) are entirely unaffected by conventional purchase incentives because they are almost guaranteed to receive the reward based on their current spending habits. Thus, the store rewards customers, such as household C, even though household C does not increase its loyalty to the store.

SUMMARY OF THE INVENTION

Accordingly, one object of this invention is to provide a novel method, system, and computer program product for delivering purchase incentives to individual customers based on their purchase histories.

It is another object of the present invention to provide a novel method, system, and computer program product for increasing shopper loyalty to particular retail stores and/or retail chains.

These and other objects are achieved according to the present invention by providing a novel method, system, and computer program product for delivering purchase incentives. The method, on which the system and computer program product are based, includes the steps of receiving identifying information of a customer; determining a purchase incentive associated with the identifying information of the customer and based on purchase history information of the customer, the purchase incentive including a loyalty condition for the customer to meet and a reward to be provided to the customer; delivering the purchase incentive to the customer; receiving again the identifying information of the customer; determining whether the customer has met the condition of the purchase incentive; and rewarding the customer, based on the reward, if the customer has met the condition of the purchase incentive. The method may be implemented using a computer in the retail store and/or a host computer remote from the retail store.

Thus, purchase incentives are tailored to the individual purchase histories of each customer. For example, households that exhibit relatively low expenditures on groceries will receive purchase incentives different from the purchase incentives delivered to households that exhibit relatively high expenditures on groceries. Preferably, the conditions of the purchase incentives provided to customers exhibiting low spending are easier to meet than the conditions of the purchase incentives provided to households exhibiting high spending.

According to one aspect of the invention, a purchase incentive is printed for a customer at a point of sale within a retail location, irregardless of the customer's identity. The purchase incentive includes: a reward, a time condition specifying a period of time within which the customer must return to the store in order to receive the reward, and a purchase condition that the

customer must meet in order to receive the reward. A computer at the retail location or remote from the retail location determines whether the customer has met the time condition and the purchase condition. The customer is rewarded based on the reward if the customer meets the time condition and the purchase condition. Accordingly, a loyalty program, which doesn't require frequent shopper cards or other identifiers, is provided. This aspect of the invention may conveniently incorporate existing printers and store computers, thereby reducing the amount of hardware needed to realize the inventive loyalty program.

Preferably, the offers are for staple items so that consumers have a reason to continue coming back to the store or chain at which the purchase incentive was received. In a preferred embodiment, the offers are extraordinary offers (e.g., 5¢ for a gallon of milk) that are only available for a short period of time (e.g., one week). The purchase incentives may be made available to everyone who purchases products, regardless of whether customer identification is provided at checkout. As a result, existing customers will be induced to maintain their loyalty, and sporadic and first time customers will be induced to become more loyal to the store or chain offering the purchase incentives.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the invention and many of the attendant advantages thereof will be readily obtained as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

Figure 1 is a schematic illustration of a system for providing purchase incentives, including preferred pricing, to consumers in accordance with the present invention;

Figure 2 is a purchase history table for associating identifying information of customers with their respective purchase histories;

Figure 3 is a classification table for classifying customers and for associating qualification requirements of each classification with a purchase incentive, including a reward and the conditions that a customer must meet to receive the reward;

Figure 4 is a purchase incentive table for associating customers with purchase incentives

to be provided to the customers;

Figures 5A, 5B, 5C, and 5D are examples of purchase incentives provided in accordance with the present invention;

Figure 6 is a flowchart for explaining the delivery of purchase incentives to customers based on the individual purchase histories of the consumers;

Figure 7 is a flowchart for explaining how a purchase incentive designed to increase customer loyalty to a particular retail location or chain is provided in accordance with the present invention; and

Figure 8 is an exemplary computer system programmed to perform one or more of the special purpose function(s) of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, and more particularly to Figure 1 thereof, a schematic illustration of a system for providing purchase incentives is shown. The system includes a remote computer 101, a consumer database 103, and one or more retail stores 105. Each retail store includes a store computer 109, one or more scanners 117 and terminals 121, one or more printers 125, and a store database 113. Preferably, each scanner 117 is associated with one of the terminals 121 and one of the printers 125.

The host computer 101 is any suitable server, work station, personal computer (PC), or other device for monitoring consumer purchase activity in the retail store 105, for storing information of the purchase activity in the consumer database 103, and for controlling the distribution of purchase incentives. The host computer 101 communicates with the store computer 109 using any suitable protocol and may be implemented using the computer system 801 of Figure 8, for example.

The consumer database 103 is a file that includes records containing information for providing purchase incentives in accordance with the present invention. This purchase history information includes information of each purchase made by a customer in the retail store 105. Such information may include the shelf keeping unit (SKU), the brand, size, weight, price, date

and time of purchase, and customer identification (customer ID) of the consumer making the purchase, for example. In one embodiment, portions of this information are obtained from bar codes on purchased items, which are scanned by the scanner 117 during a transaction. Each record in the consumer database 103 contains fields together with a set of operations for searching, sorting, recombining, and other database functions. The consumer database 103 may be implemented as two or more databases, if desired. One or more of U.S. Pat. Nos. 5,832,457; 5,649,114; 5,430,644; and 5,592,560 describe techniques for collecting consumer purchase information and for storing such information in databases such as the consumer database 103 and the store database 113. U.S. Pat. Nos. 5,832,457; 5,649,114; 5,430,644; and 5,592,560 are incorporated herein by reference. Additionally, techniques for collecting consumer purchase information and for storing such information in databases, such as the consumer database 103 and the store database 113, are described in other patents owned by Catalina Marketing and/or Catalina Marketing International. Each patent owned by Catalina Marketing and/or Catalina Marketing International is incorporated herein by reference.

The retail store 105 is any location where goods are kept for retail sale to customers. The retail store 105 may be a part of a retail store chain.

The store computer 109 may be implemented using the computer system 801 of Figure 8, for example, or any other suitable PC, work station, server, or device for communicating with the host computer 101, storing and retrieving information in the store database 113, and communicating with the scanner 117, terminal 121, and printer 125. The store computer 109 performs functions related to providing purchase incentives in accordance with the present invention as well as the functions of a conventional store controller (e.g., as described in U.S. Patent No. 5,173,851).

The store database 113 is a file that includes records containing information for providing purchase incentives in accordance with the present invention. Each record in the store database 113 contains fields for associating bar codes with products in the retail store 105, associating consumer IDs with purchase incentives, and associating conditions of the purchase incentives with rewards. The store database 113 also includes operations for searching, sorting, recombining, and other database functions. The store database 113 may be implemented as two

or more databases, if desired. Periodically, sales transaction information stored in the store database 113 is retrieved by the store computer 109 and sent to the host computer 101, which uses the information to update the purchase history information stored in the consumer database 103.

The scanner 117 is associated with a cashier at a point of sale. The scanner 117 is any suitable scanning device for scanning indicia, such as bar codes, on products, coupons, purchase incentives, promotions, advertisements, and any other tangible medium. The terminal 121 may be a conventional cash register and communicates with the store computer 109 and the scanner 117. The terminal 121 may receive information entered by a cashier as well as bar code information received from the scanner 117. Such information is sent to the store computer 109, which processes the information. The terminal 121 also displays information received from the store computer 109.

The printer 125 is any suitable printing device for printing coupons and other announcements (e.g., purchase incentives) at the point of sale. The printer 125 is in communication with, and controlled by, the host computer 101 and/or the store computer 109.

It is to be understood that the system in Figure 1 is for exemplary purposes only, as many variations of the specific hardware used to implement the present invention will be readily apparent to one having ordinary skill in the art. For example, the functionality of the store computer 109 may be divided between a standard store controller for controlling the terminal 121 and a separate computer for communicating with the host computer 101 and for monitoring sales transaction data and signals transmitted from the terminal 121 to the store computer 109. These implementations and other implementations of retail computer systems are described in greater detail in one or more of U.S. Pat. Nos. 4,723,212; 4,910,672; 5,173,851; 5,612,868; and 6,026,370, each of which is incorporated herein by reference. To implement these variations as well as other variations, a single computer (e.g., the computer system 801 of Figure 8) may be programmed to perform the special purpose functions of two or more of any of the devices shown in Figure 1. On the other hand, two or more programmed computers may be substituted for any one of the devices shown in Figure 1. Principles and advantages of distributed processing, such as redundancy and replication, may also be implemented as desired to increase

the robustness and performance of the system, for example.

The present invention stores information relating to various customers who shop at the retail store 105, the purchase histories of those customers, purchase incentives, and the classification of customers, for example. This information is stored in one or more memories such as a hard disk, optical disk, magneto-optical disk, and/or RAM, for example. One or more databases, such as the consumer database 103 and the store database 113, may store the information used to implement the present invention. The databases are organized using data structures (e.g., records, tables, arrays, fields, graphs, trees, and/or lists) contained in one or more memories, such as the memories listed above or any of the storage devices listed below in the discussion of Figure 8, for example.

Figures 2, 3, and 4 depict data structures used for implementing a system for providing purchase incentives in accordance with an embodiment of the present invention. The data structures are depicted in a relational format, using tables, whereby information stored in one column (i.e., field) of a table is mapped or linked to information stored in the same row (i.e., record) across the other column(s) of the table. These data structures are used by the host computer 101 and/or the store computer 109 to provide purchase incentives to consumers in accordance with the present invention. The data structures shown in Figures 2, 3, and 4 are stored in the consumer database 103, the store database 113, and/or any other suitable storage device(s).

Figure 2 is a purchase history table 201 that includes a field 203 for storing consumer IDs and a field 205 for storing purchase histories of the consumers in the field 203. A consumer ID is any identifier that is scanned, read, or otherwise entered into a computer system at checkout to identify a customer. Each customer may have multiple customer IDs. Preferably, the consumer ID is represented as a bar code so that it can be quickly scanned at checkout by the scanner 117, although any other type of machine readable or non-machine readable implementations for storing or displaying identifications may be used, including magnetic strips, memory chips, and smart cards. Examples of possible consumer IDs are credit card numbers, debit card numbers, social security card numbers, driver's license numbers, checking account numbers, street addresses, names, e-mail addresses, telephone numbers, frequent customer card numbers,

shopper card identifications (SCIDs), or shopper loyalty card numbers issued by the retail store 105, although any other suitable form of identification may be used. Preferably, the field 205 is divided into several subfields for separately storing purchase data such as the location of the purchase, a description of the items purchased, the price of each item purchased, and the date and time of the transaction.

Figure 3 is a classification table 301 that includes a field 303 for storing qualification requirements, a field 305 for storing conditions of purchase incentives, and a field 307 for storing the rewards of purchase incentives. The qualifications requirements in each record of the classification table 301 include purchase behavior criteria that must be met by a customer in order for the customer to be eligible for the purchase incentive defined by the corresponding condition and reward in the same record. The purchase behavior criteria in the field 303 is compared with purchase behavior information of each customer. This purchase behavior information may be determined directly from the purchase history of the customer stored in the field 205 and/or by processing the information stored in the field 205 with the host computer 101, for example.

An example of a qualification requirement is purchase behavior criteria identifying ranges (i.e., classes) of average dollars spent per week in the store 105 over an eight week window. An example of corresponding purchase behavior information is the average amount spent at the retail store 105 per week over the last eight weeks. This information may be determined by the host computer 101, which accesses the appropriate purchase history in the field 205 for each consumer ID in the field 203. For example, the classification table 301 may include three records, and the qualification requirements in each record may be (1) up to $40 per week, (2) $41 to $199 per week, and (3) over $199 per week, respectively. For each consumer ID in the field 201, the host computer 101 determines the average amount the consumer has spent at the retail store 105 over the last eight weeks based on the purchase history information stored in the field 205. The average expenditures of each customer over the last eight weeks at the retail store 105 are compared to the qualification requirements stored in each of the three records in the field 303. If a customer meets the qualification requirements of a particular record in the field 303, then the corresponding purchase incentive to be offered to the consumer is the condition and reward

stored in the fields 305 and 307 of the same record in the fields 305 and 307, respectively.

Figure 4 is a purchase incentive table 401 that includes a field 403 for storing consumer IDs, a field 405 for storing conditions of purchase incentives, and a field 407 for storing rewards of purchase incentives. The purchase incentive table 401 is populated by the host computer 101 based on the result of comparing the qualification requirements in the field 303 with information derived from the purchase history stored in the field 205. Thus, returning to the example above, if a particular customer is to be offered a particular purchase incentive, then the consumer ID of the customer is stored in the field 403 and the condition and reward of the purchase incentive is stored in the same record as the customer's consumer ID in the fields 405 and 407, respectively.

Figures 5A, 5B, 5C, and 5D are examples of purchase incentives that may be provided in accordance with an embodiment of the present invention. These purchase incentives may be printed (e.g., by the printer 125) at a point of sale, displayed to consumers on a monitor or display screen, and/or stored in a suitable storage medium, such as a magnetic strip, smart card, and/or databases 103 and 113. Each purchase incentive includes a reward to be received by a customer and a condition that the customer must meet to receive the reward.

In a preferred embodiment, the conditions are loyalty conditions that require the consumer to exhibit increased loyalty to the store 105, a chain of stores including the store 105, and/or a particular brand or product. As shown in Figures 5A, 5B, 5C, and 5D, loyalty conditions may include time conditions identifying a period of time (e.g., within one week) in which other conditions must be satisfied, purchase conditions such as purchase amount conditions identifying an amount of money that must be spent within the time indicated by the time condition, location conditions identifying one or more locations at which the purchase conditions may be satisfied, and brand conditions identifying a brand or product that must be purchased in order to receive the reward.

Figure 5A is a purchase incentive 501 including a reward 503 (i.e., one rump roast for 10 cents per pound) and a condition 505 (i.e., spend $100 this week). Figure 5B is a purchase incentive 507 including a reward 509 (i.e., one fresh, whole chicken for 10 cents per pound) and a condition 511 (i.e., spend $50.00 this week). Figure 5C is a purchase incentive 513 including a reward 515 (i.e., one gallon of milk for 5 cents) and a condition 517 (i.e., spend $25.00 this

week). Figure 5D is a purchase incentive 519 including a reward 521 (i.e., grade A milk, for 10 cents per gallon) and a loyalty condition 523 requiring a customer to return to the store within one week (a time condition) and make a purchase (an implied purchase condition). Customers who comply with the conditions of the purchase incentives are rewarded for their increased loyalty to the store 105.

The time conditions of the exemplary purchase incentives above specify that the purchase conditions be met within one week. However, it is to be understood that the time conditions, as well as other loyalty conditions and the rewards, are flexible and may be tailored to suit different customer loyalty programs. Thus, the time condition may span several weeks or months, if desired, so that the cumulative purchases of participating customers are tracked over the time period specified by the time condition. For example, a customer averaging $25 a week in purchases may be offered a free Smithfield ham if he averages $30 a week over the next five weeks (or a total of at least $150 within five weeks). In another example, the loyalty condition may require that a customer return to the store and make a purchase five times over the next five weeks.

Depending on the desired customer loyalty program, a customer may or may not be required to meet the loyalty condition of a purchase incentive in a single shopping trip or store transaction. If a customer is not required to meet the loyalty condition in a single trip to the store 105, the host computer 101 or the store computer 109 may be programmed to track each customer's purchases and determine when the purchase condition has been met. For example, the host computer 101 may periodically check the purchase history information accumulated in the consumer database 103 to determine whether customers meet the conditions of such purchase incentives.

The store 105 benefits from the increased loyalty of the customers who satisfy the conditions of the purchase incentives. The purchase incentives 501, 507, 513, and 519 are preferably financed by the store 105. The store 105 may also specify a brand in the condition and/or the reward so that the customer is required to purchase a particular brand to meet the condition or to redeem the reward. In this case, the store 105 may also enlist the help of the manufacturer of the brand in financing the purchase incentive, since the manufacturer of the

brand benefits from customers meeting the conditions of the purchase incentives (e.g., increased brand loyalty) and receiving the corresponding rewards (e.g., increased goodwill). Preferably, when a customer meets the conditions specified by a purchase incentive, they are automatically provided with the reward and/or receive a print-out, certificate, coupon, or other redeemable item that entitles the customer to the reward.

Figure 6 is a flowchart for explaining how purchase incentives for inducing desired future retail purchase behavior are provided in accordance with an embodiment of the present invention. In step 601 purchase history information of customers is recorded in the consumer database 103. The purchase history information is updated continuously (e.g., daily) to track the purchase history as well as changes in purchase history and tendencies of the customers.

In step 602, the host computer 101 generates, for each consumer, purchase behavior information based on each consumer's purchase history. For example, if the applicable purchase behavior criterion is average dollars spent at the store 105 each week for the last year, then the host computer 101 uses the information stored in the field 205 of the purchase history table 201 to derive the purchase behavior information of each consumer's average weekly expenditures for the last year in the store 105, if necessary. The purchase behavior information may not have to be derived from the purchase history information in the field 205 (for example, if the purchase behavior information is part of the purchase history information in the field 205). In that case, step 602 includes the process of retrieving the appropriate information from the field 205. Preferably, purchase behavior criteria are indicative of customers' past and/or present spending or purchase habits in the store 105. Since there may be multiple stores 105, then the criterion may also be based on which stores and/or chains of stores each customer visits as well.

Next, in step 604, the host computer 101 determines which purchase incentives apply to each consumer by comparing the purchase behavior information acquired in step 602 to the qualification requirements stored in the field 303 of the classification table 301. Preferably, each record in the field 303 includes a range of purchase behavior criteria values and the purchase behavior information acquired in step 602 matches one of the ranges of purchase behavior criteria in the field 303. When the purchase behavior information of a consumer matches the purchase behavior criteria in one of the records in the field 303, then the corresponding

conditions and rewards in the same record (in fields 305 and 307, respectively) define the purchase incentive to be provided to that customer. Step 604 is repeated for each customer. Different classification tables 301 may be applied to each customer, with each classification table 301 corresponding to a different promotion of the store(s) 105 and/or of different product manufacturers or advertisers. During step 604, the purchase incentive table 401 is populated as a result of comparing the purchase behavior information of each customer with the qualification requirements in one or more classification tables 301. Specifically, the field 403 is populated with consumer ID, and the fields 405 and 407 are populated with the corresponding conditions and rewards from fields 305 and 307, respectively, based on the qualification requirements that the customer meets in the field 303. Thus, for example, if a customer meets the qualification requirements for the second record in the field 303, then the condition and reward in fields 305 and 307 of the second record would be copied to fields 405 and 407, respectively, in the same record as the customer's consumer ID in field 403.

Then, in step 605 the purchase incentive table 401 is sent by the host computer 101 to the store database 113. In this manner, the store database 113 is populated with one or more purchase incentive tables 401 that map consumer IDs to purchase incentives (i.e., the corresponding conditions and rewards) to be provided to the corresponding customers.

In step 607, the store computer 109 stores the purchase incentives and the associated consumer IDs in the store database 113. The purchase incentives and associated consumer IDs may be stored in one or more purchase incentive tables 401 that are populated based on the information received by the store computer 109 from the host computer 101 in step 605.

In step 609 a customer of the store 105 purchases items in a transaction at a point of sale, and the customer's consumer ID is entered or read into the terminal 121 by the scanner 117. During the transaction, a cashier scans a bar code on each item to be purchased with the scanner 117. The bar code information is transmitted to the store computer 109 or a controller, which uses information in the store database 113 to identify each scanned item. Information of each item purchased is associated with the customer's consumer ID and stored in the store database 113. As explained above, this information is periodically sent to the consumer database 103 via the store computer 109 and the host computer 101 to update the purchase history information in

the consumer database 103. In addition to scanning the items purchased by the customer, the cashier uses the scanner 117 to scan/read a bar code on the customer's frequent shopper card to input the customer's consumer ID into the terminal 121. The bar code on the frequent shopper card identifies the customer by his or her consumer ID. Alternatively, the consumer ID may be read by swiping a magnetic strip through a device for reading magnetic strips or any other desired or equivalent method for inputting the customer's consumer ID may be used (e.g., by using a keyboard or number pad of the terminal 121 to input the consumer ID).

Then, in step 611, the store computer 109 determines the customer's consumer ID by comparing the bar code information scanned from the customer's frequent shopper card to information of different consumer IDs in the store database 113. Once the store computer 109 identifies the customer by consumer ID, the store computer 109 checks the purchase incentive tables 401 stored in the store database 113 for records with the same consumer ID in the field 403. When the customer's consumer ID is found in one or more records in the purchase incentive tables 401, then the store computer 109 looks up the corresponding condition(s) and reward(s) (in fields 405 and 407) from the same record(s). Each condition and corresponding reward in the same record in the purchase incentive tables 401 form a purchase incentive.

In step 613 the store computer 109 causes the printer 125 to print out the purchase incentives associated with the customer's consumer ID in the purchase incentive tables 401. According to an embodiment of the invention, the purchase incentives include text similar to the purchase incentives 501, 507, 513, and 519. Preferably, the purchase incentives are designed to increase customer loyalty to the store 105 by providing conditions that are tailored to the current purchase behavior of the customer, based on the customer's purchase history information. Thus, the conditions provided to various customers may differ, based on the customers' demonstrated and/or current loyalty to the store 105.

The conditions provided to each customer preferably require the customer to increase his or her loyalty to the store and/or brand in order to receive the reward. Also, conditions that require greater loyalty to the store are preferably matched with greater rewards. Thus, a customer that currently spends an average of $20 a week in the store 105 may be provided with the purchase incentive 513 in Figure 5C to induce the customer to spend $25 within the next

week. A customer currently spending $40 a week in the store 105 may be provided with the purchase incentive 507 of Figure 5B to induce the customer to spend $50 the next week. Lastly, a customer currently spending $80 a week in the store 105 may be provided with the purchase incentive 501 of Figure 5A to induce the customer to spend $100 next week. Alternatively, the conditions of the purchase incentives may be derived from the purchase history information of each customer in the field 205 of the purchase history table 201. An example would be a condition that requires an 8% per week increase over the current average expenditures of each customer in the store 105. The same result may be effectively obtained by providing a large number of small ranges or classes within the field 303 of the classification table 301.

Accordingly, it can be appreciated that the present invention prevents customers from being provided with purchase incentives with conditions that are too demanding relative to their current purchase behavior as well as purchase incentives with conditions that are met by their current purchase behavior. The construction of the classification table 301 permits an advertiser to optimize the combination of condition and reward for each purchase incentive for different classes of customers, based on the customers' purchase history information in the consumer database 103.

Referring now to step 617, the store computer 109 determines whether the customer has met any of the conditions of any of the purchase incentives applicable to that customer. Step 617 may be performed automatically, based on the customer's purchase history stored in either the consumer database 103 or the store database 113, for example. The store computer 109 may also use the items purchased in the current transaction to determine whether the conditions are met in 617. Alternatively, the host computer 101 may periodically check the consumer database 103 and/or the store database 113 to determine whether the customer has met the conditions of any purchase incentive offered to the customer. In a preferred embodiment a reward may not be earned unless the corresponding purchase incentive has been provided to the customer so that the customer does not receive a reward without being made aware of the purchase incentive.

If the conditions are not met in step 617, then the process returns to step 609 when the customer revisits the store 105 and conducts another transaction at the same point of sale or a different point of sale within the store 105. If the conditions are met in step 617, then in step 619

the consumer is rewarded with one or more of the rewards for which the customer has met the corresponding conditions. Then, the process returns to step 609.

In step 619, the customer may be rewarded automatically by the store computer 109, which automatically adjusts the total price of the current transaction, based on the reward. For example, if the reward was one gallon of milk for 5 cents, then the store computer 109 would automatically change the price of one gallon of milk to 5 cents for the current transaction or, if milk is not purchased in the current transaction, automatically change the price of milk in to 5 cents in future transaction in which a one gallon container of milk is purchased. Alternatively, the store computer 109 issues a reward by causing the printer 125 to print a certificate, coupon, or other redeemable item, which the customer may redeem like a conventional coupon or certificate in the current transaction or a future transaction within the store 105 and/or another store (e.g., within the same chain of stores), if permitted. Preferably, the purchase incentive printed by the printer 125 includes a bar code, as described by one or more of the U.S. patents listed above, to prevent coupon fraud, identify which consumers are redeeming which coupons, and to indicate where the coupons are redeemable.

Figure 7 is a flowchart for explaining a purchase incentive program in accordance with an embodiment of the present invention. In step 703 the store computer 109 causes the printer 125 to print one or more purchase incentives during a transaction between a customer and the store 105 at a point of sale within the store.

The purchase incentives printed may be similar to the purchase incentive 519 in Figure 5D and preferably include a bar code that uniquely identifies the purchase incentive, as discussed above. In step 707, the cashier at the point of sale scans a bar code on any purchase incentives that the customer received previously and/or during the present transaction, if permitted. Then, in step 715 the store computer 109 determines whether the conditions of the purchase incentives scanned in step 707 have been met. Step 715 may also be performed periodically or in real time by the host computer 101 or another computer remote from the store 105.

If, in step 715, the conditions are not met, then the process returns to step 703 when the consumer returns to the store. If, in step 715, the conditions are met, then the consumer is rewarded. The consumer may be rewarded in the current transaction by reducing the cost of the

current transaction or by printing out a coupon or other redeemable certificate, as discussed above in the description of step 619. Preferably, when the consumer presents a purchase incentive for scanning in step 707, the bar code information acquired as a result of scanning the bar code on the purchase incentive is stored by the store computer 109 in the store database 113. Then, the host computer periodically requests the store computer 109 to retrieve all information of scanned bar codes on purchase incentives and to send this information to the host computer 101, which determines whether the consumer has met the conditions in step 715, based on the consumer's purchase history information in the consumer database 103. Then, in step 717, the host computer 101 sends the store computer 109 reward information, which is stored in the store database 113 and is used by the store computer 109 to reward customers when their consumer IDs are scanned by the scanner 117, indicating that they are present at the corresponding point of sale. Then, the store computer 109 causes the printer 125 to print a coupon or redeemable certificate for the reward of the purchase incentive. According to an embodiment of the invention, all or a portion of the process of step 715 may also be used in implementing the reward process of step 619 and vice versa.

The purchase incentives offered in conjunction with the exemplary method of Figure 7 are preferably remarkable offers designed to keep customers coming back to the store 105. According to an embodiment of the invention, the rewards are for staple items such as milk, eggs, bread, etc. to encourage customers to do all of their grocery shopping at the store 105 rather than shop for specific items only. An exemplary purchase incentive 519 is shown in Figure 5D. The condition 523 requires that the consumer return to the store 105 within 7 days to receive the reward 521, which is one gallon of grade A milk for 10 cents.

It is to be understood all or a portion of the processing performed by the host computer 101 may be performed by the store computer 109, and all or a portion of the processing performed by the store computer 109 may be performed by the host computer 101, in implementing the exemplary processes of Figures 6 and 7.

All or a portion of the invention may be conveniently implemented using conventional general purpose computers or microprocessors programmed according to the teachings of the present invention, as will be apparent to those skilled in the computer art. Appropriate software

can be readily prepared by programmers of ordinary skill based on the teachings of the present disclosure, as will be apparent to those skilled in the software art.

Figure 8 illustrates a computer system 801 upon which an embodiment of the present invention may be implemented. Computer system 801 includes a bus 803 or other communication mechanism for communicating information, and a processor 805 coupled with bus 803 for processing the information. Computer system 801 also includes a main memory 807, such as a random access memory (RAM) or other dynamic storage device (e.g., dynamic RAM (DRAM), static RAM (SRAM), synchronous DRAM (SDRAM), flash RAM), coupled to bus 803 for storing information and instructions to be executed by processor 805. In addition, main memory 807 may be used for storing temporary variables or other intermediate information during execution of instructions to be executed by processor 805. Computer system 801 further includes a read only memory (ROM) 809 or other static storage device (e.g., programmable ROM (PROM), erasable PROM (EPROM), and electrically erasable PROM (EEPROM)) coupled to bus 803 for storing static information and instructions for processor 805. A storage device 811, such as a magnetic disk or optical disk, is provided and coupled to bus 803 for storing information and instructions.

The computer system 801 may also include special purpose logic devices (e.g., application specific integrated circuits (ASICs)) or configurable logic devices (e.g., generic array of logic (GAL) or reprogrammable field programmable gate arrays (FPGAs)). Other removable media devices (e.g., a compact disc, a tape, and a removable magneto-optical media) or fixed, high density media drives, may be added to the computer system 801 using an appropriate device bus (e.g., a small computer system interface (SCSI) bus, an enhanced integrated device electronics (IDE) bus, or an ultra-direct memory access (DMA) bus). The computer system 801 may additionally include a compact disc reader, a compact disc reader-writer unit, or a compact disc juke box, each of which may be connected to the same device bus or another device bus.

Computer system 801 may be coupled via bus 803 to a display 813, such as a cathode ray tube (CRT), for displaying information to a computer user. The display 813 may be controlled by a display or graphics card. The computer system includes input devices, such as a keyboard 815 and a cursor control 817, for communicating information and command selections to

processor 805. The cursor control 817, for example, is a mouse, a trackball, or cursor direction keys for communicating direction information and command selections to processor 805 and for controlling cursor movement on the display 813. In addition, a printer may provide printed listings of the data structures/information shown in Figures 2, 3, 4, 5A, 5B, 5C, and 5D or any other data stored and/or generated by the computer system 801.

The computer system 801 performs a portion or all of the processing steps of the invention in response to processor 805 executing one or more sequences of one or more instructions contained in a memory, such as the main memory 807. Such instructions may be read into the main memory 807 from another computer readable medium, such as storage device 811. One or more processors in a multi-processing arrangement may also be employed to execute the sequences of instructions contained in main memory 807. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions. Thus, embodiments are not limited to any specific combination of hardware circuitry and software.

As stated above, the system 801 includes at least one computer readable medium or memory programmed according to the teachings of the invention and for containing data structures, tables, records, or other data described herein. Examples of computer readable media are compact discs, hard disks, floppy disks, tape, magneto-optical disks, PROMs (EPROM, EEPROM, Flash EPROM), DRAM, SRAM, SDRAM, etc. Stored on any one or on a combination of computer readable media, the present invention includes software for controlling the computer system 801, for driving a device or devices for implementing the invention, and for enabling the computer system 801 to interact with a human user (e.g., a customer at the store 105). Such software may include, but is not limited to, device drivers, operating systems, development tools, and applications software. Such computer readable media further includes the computer program product of the present invention for performing all or a portion (if processing is distributed) of the processing performed in implementing the invention.

The computer code devices of the present invention may be any interpreted or executable code mechanism, including but not limited to scripts, interpreters, dynamic link libraries, Java classes, and complete executable programs. Moreover, parts of the processing of the present

invention may be distributed for better performance, reliability, and/or cost.

The term "computer readable medium" as used herein refers to any medium that participates in providing instructions to processor 805 for execution. A computer readable medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media includes, for example, optical, magnetic disks, and magneto-optical disks, such as storage device 811. Volatile media includes dynamic memory, such as main memory 807. Transmission media includes coaxial cables, copper wire and fiber optics, including the wires that comprise bus 803. Transmission media also may also take the form of acoustic or light waves, such as those generated during radio wave and infrared data communications.

Common forms of computer readable media include, for example, hard disks, floppy disks, tape, magneto-optical disks, PROMs (EPROM, EEPROM, Flash EPROM), DRAM, SRAM, SDRAM, or any other magnetic medium, compact disks (e.g., CD-ROM), or any other optical medium, punch cards, paper tape, or other physical medium with patterns of holes, a carrier wave (described below), or any other medium from which a computer can read.

Various forms of computer readable media may be involved in carrying out one or more sequences of one or more instructions to processor 805 for execution. For example, the instructions may initially be carried on a magnetic disk of a remote computer. The remote computer can load the instructions for implementing all or a portion of the present invention remotely into a dynamic memory and send the instructions over a telephone line using a modem. A modem local to computer system 801 may receive the data on the telephone line and use an infrared transmitter to convert the data to an infrared signal. An infrared detector coupled to bus 803 can receive the data carried in the infrared signal and place the data on bus 803. Bus 803 carries the data to main memory 807, from which processor 805 retrieves and executes the instructions. The instructions received by main memory 807 may optionally be stored on storage device 811 either before or after execution by processor 805.

Computer system 801 also includes a communication interface 819 coupled to bus 803. Communication interface 819 provides a two-way data communication coupling to a network link 821 that is connected to a local network 823. For example, communication interface 819

may be a network interface card to attach to any packet switched local area network (LAN). As another example, communication interface 819 may be an asymmetrical digital subscriber line (ADSL) card, an integrated services digital network (ISDN) card or a modem to provide a data communication connection to a corresponding type of telephone line. Wireless links may also be implemented. In any such implementation, communication interface 819 sends and receives electrical, electromagnetic or optical signals that carry digital data streams representing various types of information.

Network link 821 typically provides data communication through one or more networks to other data devices. For example, network link 821 may provide a connection to a computer 825 (e.g., the host computer 101 or the store computer) through local network 823 (e.g., a LAN) or through equipment operated by a service provider, which provides communication services through a communications network 827. In preferred embodiments, local network 823 and communications network 827 preferably use electrical, electromagnetic, or optical signals that carry digital data streams. The signals through the various networks and the signals on network link 821 and through communication interface 819, which carry the digital data to and from computer system 801, are exemplary forms of carrier waves transporting the information. Computer system 801 can transmit notifications and receive data, including program code, through the network(s), network link 821 and communication interface 819.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described herein.

Claims:

1. A method comprising the steps of:

receiving identifying information of a customer at a point of sale within a retail store during a first transaction between the customer and the retail store;

determining a purchase incentive associated with the identifying information of the customer and based on purchase history information of the customer, the purchase incentive including a loyalty condition for increasing the customer's loyalty to the retail store and a reward to be provided to the customer for meeting the loyalty condition;

delivering the purchase incentive to the customer at the point of sale during the first transaction;

receiving again the identifying information of the customer during a second transaction;

determining whether the customer has met the loyalty condition; and

rewarding the customer during the second transaction, based on the reward, if the customer has met the loyalty condition.

2. A method according to claim 1, wherein the loyalty condition requires the customer to exhibit increased loyalty to the retail store.

3. A method according to claim 1, further comprising the step of receiving the purchase incentive from a remote computer.

4. A method according to claim 1, wherein the step of rewarding comprises printing a redeemable coupon if the customer has met the loyalty condition.

5. A method according to claim 1, wherein the step of delivering the purchase incentive to the customer at a point of sale comprises printing the purchase incentive on paper to be provided to the customer.

6. A method according to claim 1, wherein the loyalty condition of the purchase

incentive includes a rate at which the customer is to spend money and the reward is a price discount for a product to be purchased by the customer, and wherein the step of determining whether the customer has met the loyalty condition comprises determining whether the customer has spent the money at the rate specified by the loyalty condition of the purchase incentive.

7. A method according to claim 6, wherein the loyalty condition of the purchase incentive specifies at least one retail location at which the customer is to spend the money, and wherein the step of determining whether the customer has met the loyalty condition comprises determining whether the customer has spent the money at the retail location specified by the loyalty condition.

8. A method comprising the steps of:

determining for a customer, based on the purchase history of the customer, a purchase incentive including a loyalty condition for increasing the customer's loyalty to a retail location and a reward;

associating the purchase incentive with identifying information of the customer;

delivering the purchase incentive and the identifying information to a remote computer at the retail location;

receiving purchase information of the customer from the remote computer;

determining whether the customer has met the loyalty condition of the purchase incentive; and

rewarding the customer, based on the reward, if the customer has met the loyalty condition of the purchase incentive.

9. A method according to claim 8, wherein the step of rewarding the customer comprises sending to the remote computer reward information indicating that the customer has met the loyalty condition, if the customer has met the loyalty condition.

10. A method comprising the steps of:

printing at a point of sale within a retail location a purchase incentive for a customer, irregardless of the customer's identity, the purchase incentive including: a reward and a loyalty condition for increasing the customer's loyalty to the retail location, the loyalty condition including a time condition specifying a period of time within which the customer must return to the retail location in order to receive the reward and a purchase condition that the customer must meet in order to receive the reward;

determining at the retail location whether the customer has met the time condition and the purchase condition; and

rewarding the customer based on the reward if the customer meets the time condition and the purchase condition.

11. A method according to claim 10, wherein the period of time is one week, and the step of printing comprises printing the time condition, the time condition specifying that the consumer has one week to meet the purchase condition.

12. A method according to claim 10, wherein the purchase incentive comprises a brand condition specifying a particular brand that must be purchased, and the step of printing comprises printing the brand loyalty condition.

13. A computer readable medium containing program instructions for execution on a computer system, which when executed by a computer, cause the computer system to perform the method recited in any one of claims 1-12.

14. A system comprising:

a memory device having embodied therein information related to a customer loyalty program; and

a processor coupled to the memory device, the processor configured to:

receive identifying information of a customer at a point of sale within a retail store during a first transaction between the customer and the retail store;

determine a purchase incentive associated with the identifying information of the customer and based on purchase history information of the customer, the purchase incentive including a loyalty condition for increasing the customer's loyalty to the retail store and a reward to be provided to the customer for meeting the loyalty condition;

deliver the purchase incentive to the customer at the point of sale during the first transaction;

receive again the identifying information of the customer during a second transaction;

determine whether the customer has met the loyalty condition; and

reward the customer during the second transaction, based on the reward, if the customer has met the loyalty condition.

15. A system according to claim 14, wherein the loyalty condition requires the customer to exhibit increased loyalty to the retail store.

16. A system according to claim 14, wherein the processor is further configured to receive the purchase incentive from a remote computer.

17. A system according to claim 14, further comprising a printer coupled to the processor, the processor being configured to cause the printer to print a redeemable coupon if the customer has met the loyalty condition.

18. A system according to claim 14, further comprising a printer coupled to the processor, the processor being configured to cause the printer to print the purchase incentive on paper to be provided to the customer.

19. A system according to claim 14, wherein the loyalty condition of the purchase incentive includes a rate at which the customer is to spend money and the reward is a price discount for a product to be purchased by the customer, and the processor is further configured to determine whether the customer has spent the money at the rate specified by the loyalty

condition of the purchase incentive.

20. A system according to claim 19, wherein the loyalty condition of the purchase incentive specifies at least one retail location at which the customer is to spend the money, and the processor is further configured to determine whether the customer has spent the money at the retail location specified by the loyalty condition.

21. A system comprising:

a memory device having embodied therein information related to a customer loyalty program; and

a processor coupled to the memory device, the processor configured to:

determine for a customer, based on the purchase history of the customer, a purchase incentive including a loyalty condition for increasing the customer's loyalty to a retail location and a reward;

associate the purchase incentive with identifying information of the customer;

deliver the purchase incentive and the identifying information to a remote computer at the retail location;

receive purchase information of the customer from the remote computer;

determine whether the customer has met the loyalty condition of the purchase incentive; and

reward the customer, based on the reward, if the customer has met the loyalty condition of the purchase incentive.

22. A system according to claim 21, wherein the processor is further configured to send to the remote computer reward information indicating that the customer has met the loyalty condition, if the customer has met the loyalty condition.

23. A system comprising:

a memory device having embodied therein information related to a customer loyalty

program;

a printer; and

a processor coupled to the memory device and the printer, the processor configured to:

control the printer to cause the printer to print at a point of sale within a retail location a purchase incentive for a customer, irregardless of the customer's identity, the purchase incentive including: a reward and a loyalty condition for increasing the customer's loyalty to the retail location, the loyalty condition including a time condition specifying a period of time within which the customer must return to the retail location in order to receive the reward and a purchase condition that the customer must meet in order to receive the reward;

determine at the retail location whether the customer has met the time condition and the purchase condition; and

reward the customer based on the reward if the customer meets the time condition and the purchase condition.

24. A system according to claim 23, wherein the period of time is one week, and the purchase incentive specifies that the consumer has one week to meet the purchase condition.

25. A system according to claim 23, wherein the purchase incentive comprises a brand condition specifying a particular brand that must be purchased.

26. A system comprising:

means for receiving identifying information of a customer at a point of sale within a retail store during a first transaction between the customer and the retail store;

means for determining a purchase incentive associated with the identifying information of the customer and based on purchase history information of the customer, the purchase incentive including a loyalty condition for increasing the customer's loyalty to the retail store and a reward to be provided to the customer for meeting the loyalty condition;

means for delivering the purchase incentive to the customer at the point of sale during the first transaction;

means for receiving again the identifying information of the customer during a second transaction;

means for determining whether the customer has met the loyalty condition; and

means for rewarding the customer during the second transaction, based on the reward, if the customer has met the loyalty condition.

27. A system according to claim 26, wherein the loyalty condition requires the customer to exhibit increased loyalty to the retail store.

28. A system according to claim 26, further comprising means for receiving the purchase incentive from a remote computer.

29. A system according to claim 26, wherein the means for rewarding comprises means for printing a redeemable coupon if the customer has met the loyalty condition.

30. A system according to claim 26, wherein the means for delivering the purchase incentive to the customer at a point of sale comprises means for printing the purchase incentive on paper to be provided to the customer.

31. A system according to claim 26, wherein the loyalty condition of the purchase incentive includes a rate at which the customer is to spend money and the reward is a price discount for a product to be purchased by the customer, and wherein the means for determining whether the customer has met the loyalty condition comprises means for determining whether the customer has spent the money at the rate specified by the loyalty condition of the purchase incentive.

32. A system according to claim 31, wherein the loyalty condition of the purchase incentive specifies at least one retail location at which the customer is to spend the money, and wherein the means for determining whether the customer has met the loyalty condition comprises

means for determining whether the customer has spent the money at the retail location specified by the loyalty condition.

33. A system comprising:

means for determining for a customer, based on the purchase history of the customer, a purchase incentive including a loyalty condition for increasing the customer's loyalty to a retail location and a reward;

means for associating the purchase incentive with identifying information of the customer;

means for delivering the purchase incentive and the identifying information to a remote computer at the retail location;

means for receiving purchase information of the customer from the remote computer;

means for determining whether the customer has met the loyalty condition of the purchase incentive; and

means for rewarding the customer, based on the reward, if the customer has met the loyalty condition of the purchase incentive.

34. A system according to claim 33, wherein the means for rewarding the customer comprises means for sending to the remote computer reward information indicating that the customer has met the loyalty condition, if the customer has met the loyalty condition.

35. A system comprising:

means for printing at a point of sale within a retail location a purchase incentive for a customer, irregardless of the customer's identity, the purchase incentive including: a reward and a loyalty condition for increasing the customer's loyalty to the retail location, the loyalty condition including a time condition specifying a period of time within which the customer must return to the retail location in order to receive the reward and a purchase condition that the customer must meet in order to receive the reward;

means for determining at the retail location whether the customer has met the time

condition and the purchase condition; and

means for rewarding the customer based on the reward if the customer meets the time condition and the purchase condition.

36. A system according to claim 35, wherein the period of time is one week, and the means for printing comprises means for printing the time condition, the time condition specifying that the consumer has one week to meet the purchase condition.

37. A system according to claim 35, wherein the purchase incentive comprises a brand condition specifying a particular brand that must be purchased, and the means for printing comprises means for printing the brand loyalty condition.

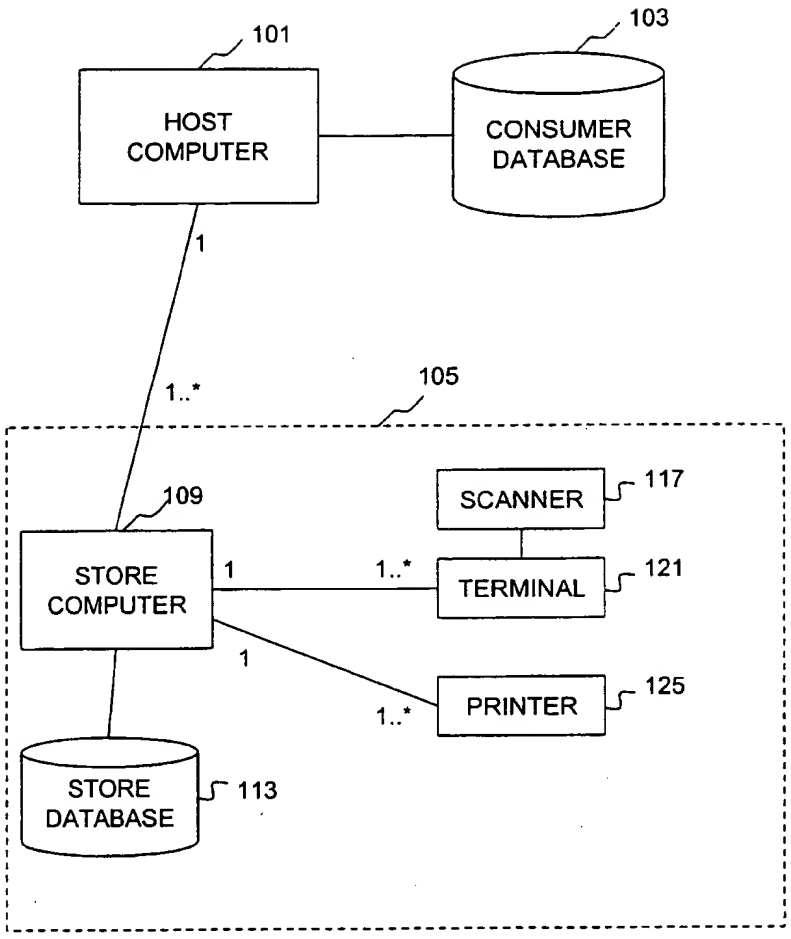
101
HOST COMPUTER
103
CONSUMER DATABASE
1
1..*
105
109
STORE COMPUTER
1
1..*
SCANNER
117
TERMINAL
121
1
1..*
PRINTER
125
STORE DATABASE
113

FIG. 1

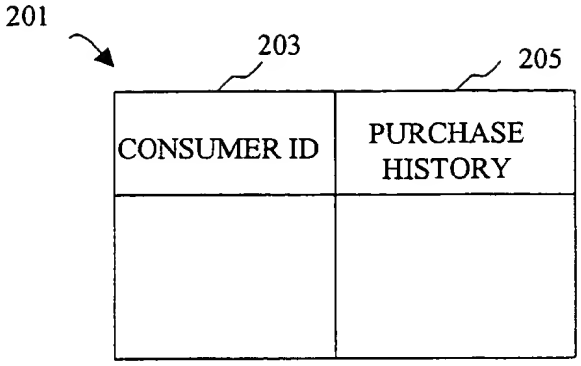

FIG. 2

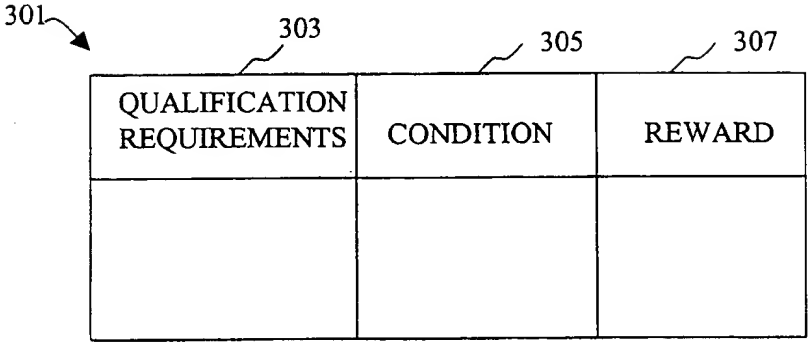

FIG. 3

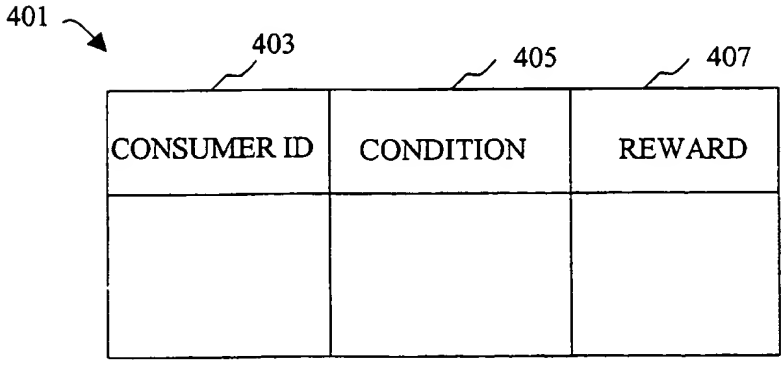

FIG. 4

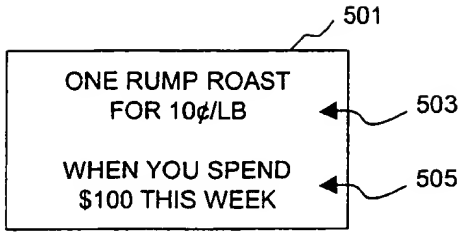

FIG. 5A

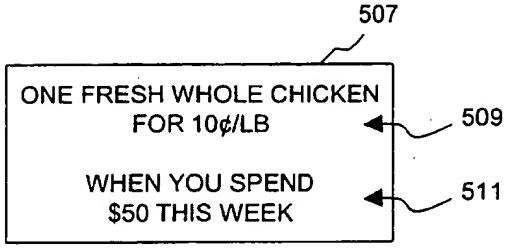

FIG. 5B

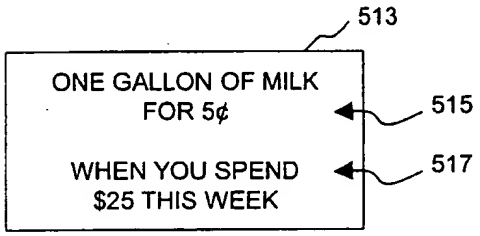

FIG. 5C

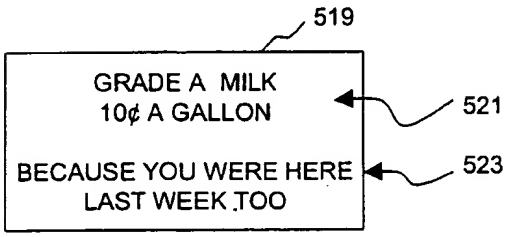

FIG. 5D

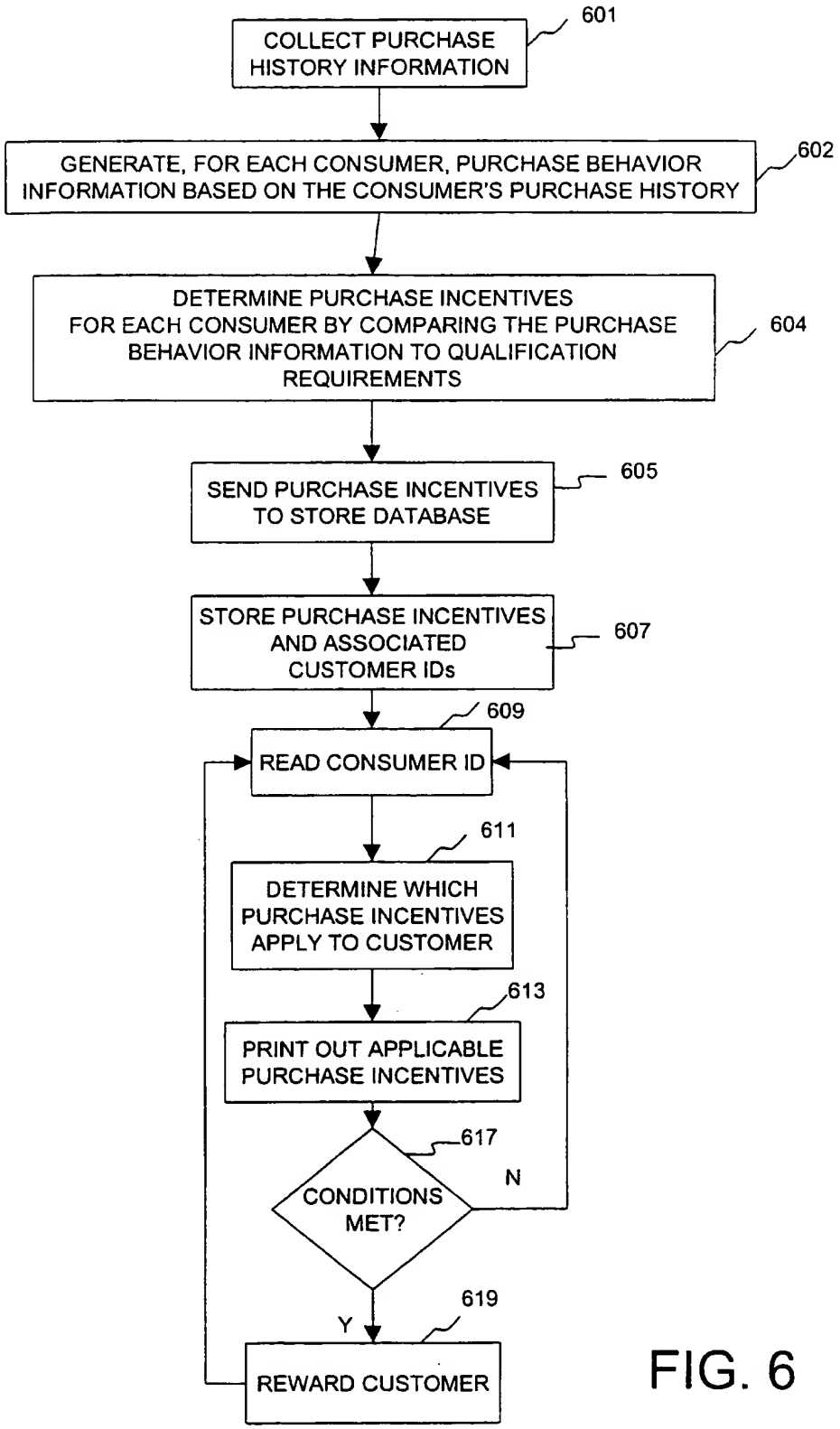
COLLECT PURCHASE HISTORY INFORMATION
601
GENERATE, FOR EACH CONSUMER, PURCHASE BEHAVIOR INFORMATION BASED ON THE CONSUMER'S PURCHASE HISTORY
602
DETERMINE PURCHASE INCENTIVES FOR EACH CONSUMER BY COMPARING THE PURCHASE BEHAVIOR INFORMATION TO QUALIFICATION REQUIREMENTS
604
SEND PURCHASE INCENTIVES TO STORE DATABASE
605
STORE PURCHASE INCENTIVES AND ASSOCIATED CUSTOMER IDs
607
609
READ CONSUMER ID
611
DETERMINE WHICH PURCHASE INCENTIVES APPLY TO CUSTOMER
613
PRINT OUT APPLICABLE PURCHASE INCENTIVES
617
CONDITIONS MET?
N
Y
619
REWARD CUSTOMER

FIG. 6

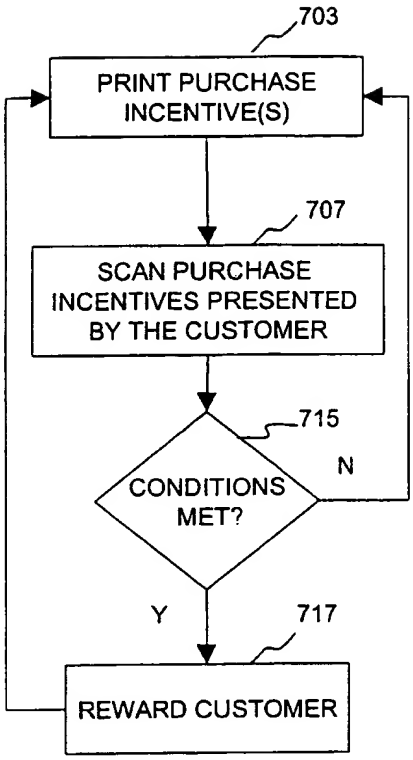
703
PRINT PURCHASE INCENTIVE(S)
707
SCAN PURCHASE INCENTIVES PRESENTED BY THE CUSTOMER
715
CONDITIONS MET?
N
Y
717
REWARD CUSTOMER

FIG. 7

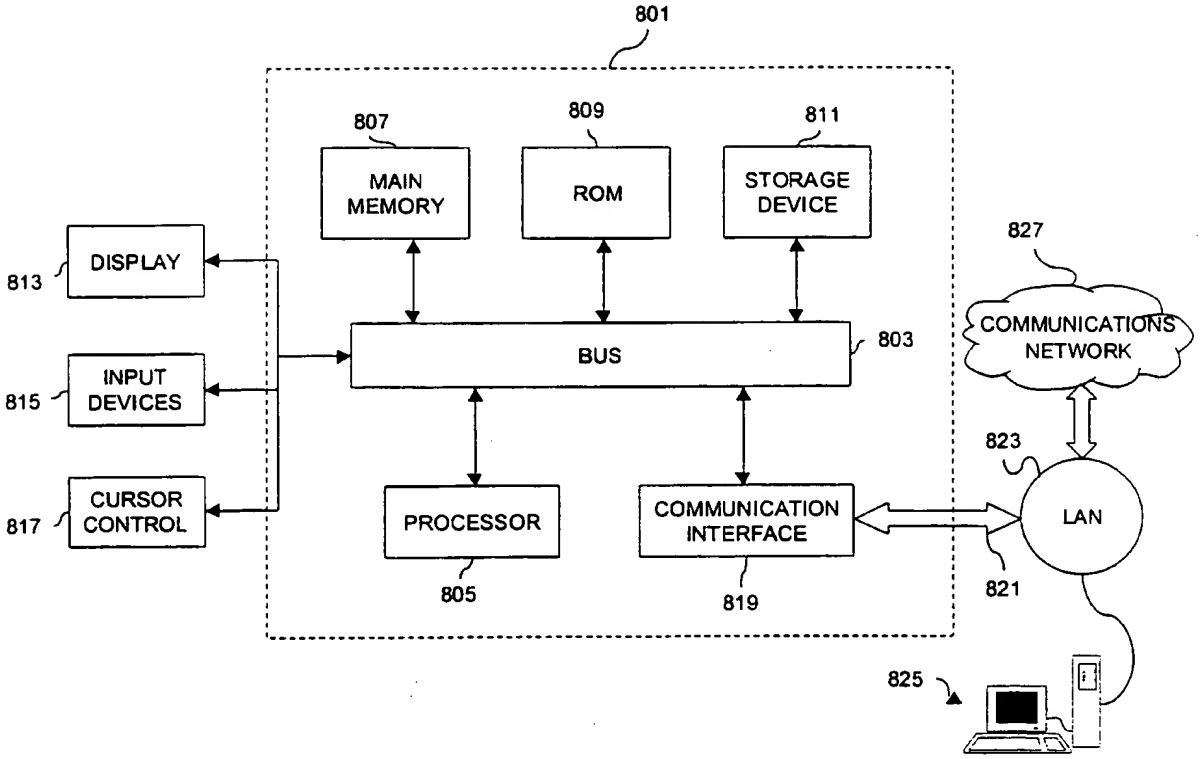
801
807
809
811
MAIN MEMORY
ROM
STORAGE DEVICE
827
DISPLAY
813
COMMUNICATIONS NETWORK
BUS
803
INPUT DEVICES
815
823
CURSOR CONTROL
817
PROCESSOR
COMMUNICATION INTERFACE
LAN
805
819
821
825

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/21972

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 17/60
US CL : 705/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/14

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

STN

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,923,016 A [FREDREGILL et al] 13, JULY 1999 Abstract, figure 1, figure 2a, column 1, lines 5-15, 43-48, 53-58, column 2, lines 53-56	1-37

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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Date of the actual completion of the international search	Date of mailing of the international search report
02 NOVEMBER 2000	08 DEC 2000
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer JAMES TRAMMEL Peggy Hamod Telephone No. (703) 305-9768

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